SALES
ENGINEERS AND
MARKETING FOLKS . . .

Gentlemen!
When you're l◎◎king,
l◎◎k to Drever
CONFIDENTIAL
clients pay fee
nothing to sign

JOHN DREVER & ASSOC.
A National Sales Personnel Service
2414 GOLDSMITH
HOUSTON, TEXAS 77025
713-666-6048

CONTROL SYSTEMS Engineers, Programmers, Sales Engineers. To $20K. Fee paid. Harper Associates, Employment Consultants. 806 Main. Houston, Tex.

MANAGER
ENGINEERING

To join major manufacturer of control valves for the process industries. Unusual career opportunity for ME with competence in fluid dynamics and 10 years experience in design and administrative duties to assume responsibility for all product and R & D engineering functions. Starting salary to $25,000.

Send resume in duplicate and salary history to:

ERIC BIANCHI
SEARCH ASSOCIATES, INC.
12 Bank Street
Summit, New Jersey 07901
(201) 277-6818

Our client pays all fees.

Index to Instrumentation Technology, Volume 18, 1971

Authors	Issue, Page
Azad, R. S.	Mar. 55
Baxley, Jr., R. A.	Nov. 39
Belsterling, C. A.	Mar. 37
Benson, J. M.	Jul. 39
Blaser, E. M.	Oct. 59
Bliss, P.	Mar. 51
Borgmeyer, J. D.	Sep. 54
Brewster, D.	Sep. 73
Cason, R. L.	Dec. 44
Chavie, W. V.	Mar. 47
Conrad, D. A.	Oct. 59
Crosetti, P. A.	Aug. 52
Crowder, R. S.	Jan. 58
Curtis, R. L.	Nov. 47
Dennstedt, F. D.	Apr. 36
Dougal, A. A.	May 43, Jun. 53
Drewry, H. S.	Jan. 49
Edens, W. R.	Jan. 49
Elias, L. F.	May 70
Fahlgren, C. E.	Apr. 47
Farwell, R.A.	Jun. 42
Friedrich, Jr., O. M.	May 43, Jun. 53
Frost, D. V.	Feb. 49
Gupta, G. K.	Mar. 55
Halbert, F. L.	Apr. 47
Holt, A. B.	Jan. 43
Hope, G. S.	Feb. 39
Ichihara, T.	Aug. 57
Inose, F.	Jan. 63
Jones, III, S.	Oct. 62
Jungck, P. R.	Nov. 43
Jura, S. J.	Feb. 39
Kaminski, R. K.	May 53, Oct. 45
Kindler, H. S.	May 36
Liptak, B. G.	Jul. 35
Little, W. D.	May 58
Lodge, Jr., J. P.	Dec 28
Luyben, W. L.	Apr 58, Sep. 69
Marroquin, G.	Sep. 69
Marschall, E.	Jul. 58
McKinney, A. H.	Aug. 49
McShane, J. L.	Jul. 44
Morgan, R. K.	Mar. 51
Neradka, V. F.	Jul. 49
Nisenfeld, A. E.	Apr. 52
Pekor, A. L.	Dec. 33
Pemberton, T. J.	Sep. 49
Reed, C. J.	Feb. 52
Rehsteiner, F. H.	Sep. 73
Robertson, A. R.	Nov. 30
Sabbagha, R. E.	Dec. 40
Sanborn, I. B.	Jan. 54
Sauer, Jr., H. J.	Sep. 54
Sayles, J. H.	Dec. 33
Schmid, J. H.	Jun. 48
Schowalter, R. E.	Sep. 54
Schuder, C. B.	May 48
Schultz, H. M.	Apr 52
Shinskey, F. G.	Oct. 34
Spiller, R. L.	Jul. 52
Taft, C. K.	Mar. 26
Takasugi, K.	Jan. 63
Thomas, R. M.	May 58
Tillman, E. R.	Aug. 43, Oct. 51
Trumpeter, J. N.	Dec. 47
Tsukada, Y.	Aug. 57
Umphenour, C. F.	Sep. 54
Upfold, A. T.	Feb. 46
Wallace, A. D.	Aug. 43, Oct. 51
Warnke, G. F.	Sep. 57
Wells, C. H.	Apr. 43
Weuste, K.	Dec. 47
Williams, T. J.	Jan. 37

Continued on next page

Great things are beckoning for
ENGINEERS
at
ESSO LIBYA

ESSO LIBYA, an affiliate of the Standard Oil Company of New Jersey, currently has openings for:

INSTRUMENT ENGINEERS—B.S. degree in Electrical Engineering. Minimum 5-8 years experience in refinery, gas plant or petrochemical processing plant . . . encompassing control theory, application in electronic instrumentation, power distribution, relay protection and switch gear. Will be Instrument Engineer for all operating facilities . . . provide technical service and design for modifications and improvements . . . be responsible for accurate record maintenance.

These are challenging assignments offering excellent salaries, plus such generous benefits as a paid annual vacation (including travel) . . . savings plan . . . tax free premium . . . and family housing in the company community at Marsa el Brega on the Mediterranean Coast. All of this—and more—now beckons at ESSO LIBYA.

Send your detailed resume
(including salary history) to:

STANDARD OIL COMPANY (N. J.)
P.O. Box 518-IT, Radio City Station,
New York, N.Y. 10019
An Equal Opportunity Employer

INSTRUMENT ENGINEER

Top 500 company with sales over $300 million needs degreed engineer with minimum of three to five years' experience with process-type industrial instrumentation. Projects include design, purchase and installation of control systems. Systems include temperature, pressure, liquid level and flow rate controls. Project responsibilities average $3 million per year in value.

Send resume and salary requirements to:

William J. Schoettle
Employment Manager
A. E. Staley Mfg. Co.
P. O. Box 151
Decatur, Illinois 62525
An Equal Opportunity Employer

Staley

XUM

Authors — **Issue, Page**

Wilson, J. H. ..... Jun. 37
Wilson, Jr., M. P. ..... Sep. 63
Wood, R. K. ..... Jun. 42
Woytowicz, E. T. ..... Nov. 43

Zanetti, R. R. ..... Mar. 42
Zanker, A. ..... Jul. 57
Zysk, E. D. ..... Nov. 30

Articles

January — Page

Applied Digital Control 37
Improved Fractionation thru Computer Control 43
Minicomputer Grades Steel Strip On-line ... 49
Papermachine Computerization Pays Off .. 54
CRT Interfaces for a Continuous Plant 58
A Data Highway System 63

February

Detecting Transmission Line Abnormalities by Computer 39
Manhour Ratings Standardized for Instrument Maintenance 46
The Calorie and the International System .. 49
How to Refill Chemical Seals 52
Redundant Circuit Provides Fail-safe Control 56

March

Fluidics Reappraised (Essay) 26
Sensing with Air 37
Continuous Proportioning for the Food Industry 42
Gas/Air Controls on Boilers 47
Errors in Temperature Measurement 51
Velocity in Varying Temperature Flow 55

April

Human Factors in Advanced Control (Essay) 36
Industrial Process Applications of Modern Control Theory 43
Hybridizing an Analog Computer for Automated Control 47
Interaction Analysis Applied to Control System Design 52
Frequency Domain Synthesis of Sampled-Data Controllers 58
Flow Simulator for Probe Calibration 62
Dynamic Evaluation of Transducers 62
Digital Input is Buffered to Analog Display.. 63

May

A New Activism for EJC (Essay) 36
Optical Data Systems—Part I 43
Understanding Fluid Forces in Control Valves 48
Ergonomic Route to Interfaces 53
A Clip-on Computer Interface for Process Control 58
Summer-Fall Short Course Roundup for Instrument Engineers, Technicians 62
Omniseal for Low Temperatures 69
Explosion-proof Battery Case 69
Electromagnetic Force Transducer 70

June

Thermoelectric Method Indicates and Controls Casting-mold Level 37
Computerized Design and Analysis of Control Loops 42
Maintaining Force Balance Transmitters ... 48
Optical Data Systems—Part II 53

July

Flow Metering Accuracy 35
Thermal Flow Sensors 39
Ultrasonic Flowmeter Basics 44
Fluidic Wind Sensors 49
The Art and Practice of Orifice Flow Metering 52
Nomograph Finds Liquid Flow Rate in Centrifugal Meters 57
Flow Measurement Method 58
Water Velocity Meter 58

August

FM Multiplex Data Handling—Part I 43
Troubleshooting Processes with Radiation Surveys 49
Fault Tree Analysis for Systems Reliability .. 52
Diaphragm Seals Applied to Orifice and Venturi Meters 57

September

In-plant Trial of a New Pulse Testing Method 49
Induction Field Effects on Strain Gage Measurements 54
Industrial Radiation Pyrometers 57
A Survey of Mass Flowmeters 63
Root Locus Plots in the Lnz-Plane 69
Fluidic Device Controlled by Temperature .. 73
Insert Saves Flowmeter Liners 73

October

To Teach Creativity (Essay) 34
The Self-erasing Recorder 45
FM Multiplex Data Handling—Part II 51
Active Digital Sensor for Biomedical Pressure 59
Method for Making Leak-proof TC Fittings .. 62
Temperature Measuring Instrument 62

November

Thermocouples for Above 1,500 deg C 30
Computer Control of Severity in Ethylene Cracking Furnaces 39
Understanding pH Control 43
Functional Requirements for Industrial Computer Systems 47
Metal Detector System 51

December

When NOT to Use On-line Air Pollution Instruments (Essay) 28
Computerized Material Balance Achieves Level Control 33
Diagnostic Sonar 40
Analyze Your Maintenance Records—Thoughtfully 44
Calibrator for Oxygen Analyzers 47
Installing Thermocouples in Thin Walls..... 47

Subject

(News items denoted by "N" after page number)

Subject — **Issue, Page**

Accuracy
Mar 51; Apr 12N; Jul 35; Aug 57; Sep 54.

Advanced control
Jan 37, 43; Apr 36, 43, 47, 52, 58; Dec 22N.

Analog control
Mar 42, 47; Apr 52; May 9N; Jun 37; Nov 43.

Analyzers
Jan 21N; Mar 14N; May 53; Jun 9N, 25N; Jul 58; Nov 39, 43; Dec 26, 47.

Batching
Mar 42; Apr 47.

Biomedical
Jan 9N; Aug 33N; Oct 59; Nov 7N, 12N; Dec 40.

Calibration
Mar 51; Apr 62; Aug 57; Nov 30; Dec 47.

Chemical & petroleum
Jan 37, 43, 58, 63; Feb 46, 52; Apr 36, 47, 52; May 53; Aug 49; Sep 49; Nov 39; Dec 33.

Computer control
Jan 37, 43, 49, 54, 58, 63; Feb 39; Mar 16N; Apr 36, 43, 47; May 53, 58; Jul 22N; Sep 49; Oct 12N; Nov 39, 47; Dec 22N, 33.

Computer programming
Jan 49; May 53; June 42; Sep 49; Nov 47.

Computers, digital (see also computer control)
Feb 12N; Mar 7N, 14N; Sep 20N; Dec 22N.

Controllers
Jan 10N; Feb 10N, 46; Mar 26, 42; Apr 52, 58; Sep 49.

Data acquisition & handling
Jan 49, 63; Mar 51; Apr 63; May 43, 58; June 53; Aug 43; Oct 51.

Direct digital control
May 53; Sep 49.

Display
Jan 58; Mar 16N; Apr 36, 63; May 53; Oct 12N, 45; Dec 22N, 40.

Dynamic analysis
Apr 43, 52, 58, 62; May 48; Jun 42; Sep 49, 69.

Economics
Jan 37, 54; Feb 9N, 12N; Apr 47; Jun 16N; Aug 34N; Sep 26N; Nov 39.

Education, training
Jan 10N; Apr 36; May 36, 62; Oct 34.

Flow
Mar 47, 55; Jun 48; Jul 7N, 35, 39, 44, 49, 52, 57, 58; Aug 57; Sep 63, 73.

Fluidics
Mar 26, 37; Jul 49; Sep 73.

Food industry
Mar 42.

Information retrieval
Jun 12N; Jul 22N; Nov 8N, 16N.

Installation
Jan 63; Feb 52; May 69; Aug 57; Sep 73; Oct 62; Dec 47.

Interkama
Dec 22N.

ISA conference & exhibit
Sep 91N; Nov 4N; Dec 7N.

Level
Mar 37; Jun 37; Aug 49; Dec 33.

Logic
Jan 63; Feb 39; Mar 47; Apr 63; Aug 52.

Maintenance
Feb 46; May 69; Jun 48; Jul 10N; Aug 49, 57; Sep 73; Dec 44.

Marketing
Feb 12N; Jun 25N; Aug 33N; Nov 8N; Dec 16N.

Metric system (see SI)

Metrology
Feb 49; Mar 7N, 51; Apr 12N; Jul 22N; Oct 7N.

Multiplexing
Jan 63; May 43, 58; Jun 53; Aug 43; Oct 51.

Noise
Aug 43; Sep 54; Oct 51; Dec 33.

Photometric techniques
May 43; Jun 53; Sep 57.

Pollution control
Apr 7N; May 25N; Jun 9N; Sep 16N; Nov 43; Dec 28.

Power industry
Feb 39; Mar 47; May 53.

Power supplies
May 69; Aug 14N.

Pressure
May 69; Jun 48; Oct 59.

Professional data
Feb 9N; May 36, 62; Jun 14N; Jul 24N; Aug 8N; Oct 34.

Radiation gages
Aug 49; Sep 57.

Recorders
Feb 46; May 10N; Oct. 45.

Reliability
Feb 56; Aug 52; Dec 44.

Remote sensing
Sep 16N.

Safety
Jan 9N; Feb 52, 56; May 69; Nov 12N.

Sampled-data systems (see also computer control)
Apr 58; Sep 69.

Sensors
Mar 37, 51, 55; Apr 62; Jun 37; Jul 35, 39, 44, 49, 52, 58; Sep 57, 63; Oct 59, 62; Nov 30, 51.

SI
Feb 49; Mar 7N; Oct 7N.

Signal conditioning
Jan 63; Apr 63; May 58; Oct 51.

Simulation
Apr 62; May 53; Jun 53; Sep 20N.

Software (see computer programming)

Standards
Jan 21N; Feb 49; Mar 7N; Apr 12N; Oct 7N; Nov 47; Dec 16N.

Steel industry
Jan 49; Apr 43; May 9N, 53; Jun 37.

Strain gages
Sep 54.

Switching
Jan 63; Apr 63; Sep 73.

Temperature
Mar 37, 51, 55; Jun 48; Aug 7N; Sep 57, 73; Oct 62; Nov 30; Dec 47.

Test measurements
Mar 37; Sep 54; Dec 47.

Theory
Apr 43, 52, 58; Jun 42; Aug 52; Sep 49, 69; Dec 44.

Thermocouples
Mar 51; Jun 37; Aug 7N; Oct 62; Nov 30; Dec 47.

Thermoelectric techniques
Feb 49; Jun 37; Jul 39; Aug 7N; Sep 63.

Transmitters
Feb 46, 52; Mar 37, 42; Apr 62; May 70; Jun 48; Jul 35, 39, 44, 49, 52, 58; Aug 57; Sep 63; Oct 62.

Tuning
Apr 52, 58; Jun 42; Sep 49.

Ultrasonics
Jul 44; Dec 40.

Unit operations
Jan 43; Mar 42, 47; Apr 47, 52; Jun 9N; Nov 39.

Valves
Feb 56; Mar 47; May 48.

Weighing
Mar 42.

XUM